

**Washington Department of Ecology  
Hazardous Waste & Toxics Reduction Program  
Compliance Report**

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**Site: US Dept of Energy Hanford Facility**      **RCRA Site ID: WA7890008967**

Inspection Date: January 31, 2013 – July 8, 2013

Site Contacts: Cliff Clark

Phone: 509 376-9333

Site Location: Hanford Facility

Richland, WA 99352

NAICS#: 562211

Current Site Status: Large Quantity Generator

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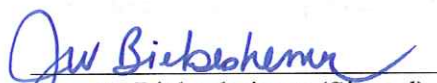
**Ecology**

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Phone: (509) 372-7898

Report Date: July 8, 2013

Report By: Joannette Biebesheimer & Jerry French

  
Joannette Biebesheimer (Signed)

7/11/13  
(Date)

  
Jerry French (Signed)

7/8/13  
(Date)

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**Background:**

The Hanford Facility Agreement and Consent Order (HFACO) also known as the Tri-Party Agreement (TPA) provides a work schedule in Appendix D. It includes the major and interim milestones that represent the actions necessary to ensure acceptable progress toward Hanford Site compliance with RCRA, CERCLA, and the Washington State Hazardous Waste Management Act (HWMA). The M-091 Milestones contain schedules of compliance applicable to removal of retrievably stored waste (RSW) from the Hanford Low Level Burial Grounds, as well as eliminating the backlog of mixed low-level waste (MLLW) and transuranic mixed waste (TRUM) for disposal by December 31, 2030. The TPA Milestone M-091 requires that MLLW is to be treated to Land Disposal Restriction (LDR) standards in accordance with WAC 173-303-140 incorporated by reference and disposed of at Hanford Mixed Waste Trenches 31/34. The TPA Milestone M-091 stipulates that TRUM may be certified and shipped to the Waste Isolation Pilot Plant (WIPP) in lieu of treatment.

**Scope and Methods of the Inspection**

The purpose of this inspection was to conduct a Non-Financial Records Review (NRR) of waste designation and transportation activities employed by US Dept of Energy Hanford Facility (DOE) RSW management. This inspection did not include site visits. The scope was limited to a shipment of mixed waste from the Hanford Facility to Permafrix Northwest (PFNW) on March 23, 2012. Manifests and documents associated with the March 23, 2013 were reviewed.

Ecology inspectors reviewed historical information in the public records pertaining to waste designation, debris designation, waste characterization, use of acceptable knowledge to designate waste, shipping documents. A list of documents that were reviewed are in the Appendix of this report.

### **Report Summary**

This inspection conducted a Non-Financial Records Review (NRR) of US Dept of Energy Hanford Facility (DOE) RSW management. Elements evaluated were identification and designation of RSW, hazardous waste and debris, the preparation of hazardous and mixed waste for transport to an off-site location, and determination of whether waste transportation was "in commerce" between DOE and Permafix Northwest (PFNW). PFWN is located at 2025 Battelle Boulevard, Richland Washington.

The Dangerous Waste Regulations Chapter 173-303 WAC, 40 CFR RCRA, 49 CFR Hazardous Material Regulations (HMR) and 10 CFR part 71 Nuclear Regulatory Commission Regulations were reviewed. DOE generator activities related to designation of Low Level Burial Grounds Waste Retrieval Project Unit 17 (RSW) waste and preparing the waste for transport were reviewed.

### **Waste Designation**

- 1985 Part B Application for the Low-Level Burial Grounds (LLBG) and Retrievable Storage (Part B) The Part B Application states that significant quantities of ignitable, corrosive liquids and reactive wastes are buried in the trenches. The Part B Application states that up to 15 gallons of liquid per 55-gallon drum were buried in the trenches until 1977. Part B identifies D001-Ignitable, F001-F005-Chlorinated and non-chlorinated solvents, U151 and D009-Mercury, D008-Lead, WT01-WA State-only extremely hazardous waste, WT02-WA state-only dangerous waste, WP01-WA state-only extremely persistent dangerous waste, WPO2-WA state-only persistent dangerous waste and WC01 and WC02-WA state-only carcinogenic dangerous waste as being buried in the Hanford LLBG.
- February 2010 Acceptable Knowledge Summary Report for the Hanford-One Waste Stream (AKR)-The AKR identifies RSW as being a hazardous debris that does not contain liquids or waste codes for D001 ignitable, D002 corrosive or D003 reactive wastes. Additionally, the AKR identifies the following RSW waste streams buried in the trenches:
  - Toxic Metals- D004-Arsenic, D005-Barium, D006-Cadmium, D007-chromium, D009-Mercury, D010-Selenium, D011-Silver
  - Toxic Organics-D018-Benzene, D019-Carbon tetrachloride, D022-chloroform, D027-1,4-dichlorobenzene, D028-1,2-dichloroethane, D029 1,1-dichloroethylene, D030-2,4-dinitrotoluene, D034-hexachloroethane, D035-methyl ethyl ketone, D037-pentachlorophenol, D043-vinyl chloride
  - Spent Solvents-F001, F002, F003, F004, F005-chlorinated and non-chlorinated solvents



- Buried waste streams designated in the 1985 Part B Application do not match the same waste streams designated in the February 2010 AKR document.
- MLLW and TRUM retrieved from the Hanford burial grounds is transported on-site to the Hanford Solid Waste Operations Complex (SWOC), T-Plant Complex, Waste Receiving and Processing Facility (WRAP), or the Central Waste Complex (CWC). Each of these facilities is also referred to as being a treatment, storage and/or disposal (TSD) facility.

### Debris Designation

The Environmental Protection Agency (EPA) provided detailed definitions of debris and hazardous debris in Federal Register, Vol. 57, No. 160, Tuesday, August 18, 1992 (FR 57). FR 57 also provided detailed discussion of treatment standards for hazardous debris. Regulation of debris and hazardous debris is set forth in 40 CFR part 268 Land Disposal Restriction (LDR) regulations. Ecology has adopted the LDR's by reference in WAC 173-303-140(2).

The definition for debris is in WAC 173-303-140(2) and by reference in 40 CFR part 268.2(g) as follows: *Debris means solid material exceeding a 60 mm particle size that is intended for disposal and that is: A manufactured object; or plant or animal matter; or natural geologic material. However, the following materials are not debris: any material for which a specific treatment standard is provided in Subpart D, Part 268, namely lead acid batteries, cadmium batteries, and radioactive lead solids; process residuals such as smelter slag and residues from the treatment of waste, wastewater, sludges, or air emission residues; and intact containers of hazardous waste that are not ruptured and that retain at least 75% of their original volume. A mixture of debris that has not been treated to the standards provided by § 268.45 and other material is subject to regulation as debris if the mixture is comprised primarily of debris, by volume, based on visual inspection.*

FR 57 provides clarification for the definition and treatment of debris and hazardous debris as follows:

- Debris must be a solid material in a literal sense as defined in a common dictionary. Examples of solid materials that are debris intended for discard if particle size is greater than 60 mm (2.5 inches) or greater are glass, concrete (excluding cementitious or pozzolanic stabilized hazardous waste), masonry, refractory bricks, non-intact containers (e.g. crushed drums), tanks, pipes, valves, appliances, or industrial equipment, scrap metal, animal carcasses, tree stumps and other plant matter, rock, cobbles and boulders, and paper, plastic and rubber. Defining debris as a solid material is in accord with a common sense view of what debris is, but more importantly, it is geared to the treatment standards to ensure decontamination of solid materials by removal or destruction of hazardous waste.
- Debris may contain or be mixed with liquids. The liquids may be liquid hazardous waste or ground or surface water that may be entrapped in the debris, or may be oozing from the debris if the debris was newly generated or newly excavated from a remediation site. Liquids that are entrapped in debris will be effectively treated under the treatment or extraction technologies set forth in the LDR's. Liquids that separate from hazardous debris prior to treatment for debris under 40 CFR part 268.45 must be managed as hazardous waste.



- If an debris extraction technology in 40 CFR part 268.45 is used then the toxic constituents in the liquid will be removed from the debris as a treatment residue and subject to all applicable LDR's for the waste contaminating the debris.
- Free liquids (including free liquids in crushed containers) cannot be present in debris that is macroencapsulated or sealed, and cannot be present in debris that is microencapsulated. Macroencapsulatin and microencapsulation technologies are described in 40 CFR part 268.45
- Mixtures of debris and other materials are subject to regulation as debris if debris is the "primary material" present. The "primary material" present in a mixture of debris is determined by visual inspection which comprises the largest amount of the material present by volume, to be determined by visual inspection. The rule does not require debris and non-debris materials to be separated prior to treatment, but rather, mixtures are either classified as debris or some other type of waste treatability group according to the visual inspection test previously discussed above.  
*Example: If upon examination a mixture of cobbles (e.g., with particle size of 60 mm or more), soil, and sludge is comprised mostly of cobbles, the mixture is classified as debris. After being treated by one of the treatment methods for debris (e.g., 40 CFR part 268.45) it could be land disposed. Residues generated after applying the 268.45 debris treatment method could be land disposed after being treated for the prohibited waste that contaminated the debris.*
- The "primary material" present test for classifying debris as explained above does not apply to intact non-empty containers. The empty container rule in 40 CFR part 261.7 or in WAC 173-303-160 applies to an intact container that also holds a hazardous waste. Hazardous waste in a non-empty container is fully subject to all LDR prohibitions as well as all applicable RCRA and chapter 173-303 WAC regulations.
- Intact containers are never considered to be debris. Intact containers that are dented but not ruptured (e.g., vials, buckets, drums, boxes, cartons, cases, roll-off boxes, kegs, carboys, bags, barrels, etc.) that hold a mixed waste do not define as debris. The LDR standards apply in cases where the debris and the waste are inseparable within a container. However, waste materials in a ruptured container can remain in the container and the entire matrix treated as debris only if the wastes are not readily separable in the container.
- By intact container EPA means a container that can still function as a container. A container that is unbroken and still retains at least 75% of its original holding capacity is still intact. *Example: At a remediation site, ruptured drums are discovered still containing some prohibited hazardous waste. Mixed with these drums are other drums that are not significantly damaged or crumpled and still contain prohibited hazardous wastes. Under the LDR's the ruptured drums are debris and cannot be land disposed until treated by one of the debris treatment methods (40 CFR part 268.45). If hazardous waste is removed from the drum during treatment the waste like all treatment residues, is subject to the LDR's treatment standards for a prohibited waste. With respect to the unruptured drums, those that are intact (e.g., those that contain 75% of their original volume) are nonempty under 40 CFR part 261.7 or in WAC 173-303-160. The waste in the unruptured and intact drums are subject to the treatment standards for the prohibited waste (e.g., waste in non-empty container is subject to all LDR prohibitions as well as all applicable RCRA 40 CFR and chapter 173-303 WAC regulations). Those that are not intact (e.g., those that contain less than 75% of their original volume) are debris.*

The AKR concludes that all RSW is debris. However it also states that there are liquids in the RSW. The 1985 Part B Application for the Low-Level Burial Grounds and Retrievable Storage states that up to 15 gallons of liquid per 55-gallon drum were buried in the trenches until 1977. The definition for debris



in 268.2(g) does not include liquids. Waste material identified and designated in the Part B application and the AKR are not consistent with the definition for debris in 268.2(g).

Some of the RSW mixed waste will define as debris. Some of the RSW mixed waste will not define as debris. DOE needs to determine what RSW mixed waste will define as debris to comply with 40 CFR part 268 LDR requirements and all applicable requirements of chapter 173-303 WAC.

#### Transportation of Hazardous Waste

- *Hanford Sitewide Transportation Safety Document (TSD) June 2011.* Transportation of hazardous waste on-site of the DOE facility is managed according to the June 2011 Hanford Sitewide Transportation Safety Document (TSD).

The TSD defines the on-site Transportation & Packaging (T&P) program at the DOE-Hanford Site, which complies with the U.S. Department of Energy (DOE) transportation safety requirements specified in DOE Order 460.1C, *Packaging and Transportation Safety*. The TSD encompasses all on-site shipments of government-owned hazardous materials, substances, and wastes within the Hanford Site, which includes radioactive materials and wastes.

The TSD requires that Hanford on-site transportation safety be equivalent to the HMR's and 10 CFR part 71. DOE Order 460.1C requires that on-site shipments comply with the HMR's and FMSCA requirements or the Hanford site specific TSD.

DOE Order 460.1C requires that entities who arrange off-site shipments must perform packaging and transportation activities in accordance with the Department of Transportation (DOT) requirements of the Hazardous Materials Regulations (49 CFR Parts 171-180).

The TSD identifies three categories of packages, all of which achieve "equivalent safety," as required by DOE Order 460.1C for onsite shipments. This includes two categories that specifically meet the intent of 49 CFR 173 and 10 CFR 71. The third category of packages used for onsite shipments relies on a risk based approach to demonstrate an equivalent level of safety for the public and an acceptable level of safety for onsite workers.

For radioactive materials, where full compliance with the HMR's cannot be achieved, an equivalent method for achieving the accepted national level of safety is authorized by DOE Order 460.1C. When full compliance with DOT cannot be achieved because of technical or economic conditions, meeting site-specific standards and performance requirements is the preferred technique (by DOE) for achieving safety equivalent to that of following DOT regulations when shipping in commerce. Before implementing the risk based packaging method, a documented evaluation showing that DOT compliance and DOT-equivalent packaging compliance are not technically or economically practical must be prepared and retained on file for the life of the package. Evaluations for risk based packages, administrative activities, including the approval of exemptions, are conducted by the cognizant DOE Hanford Field Office Manager. Risk based packages are not generally used for transportation of nonradioactive hazardous materials.



- Rolling Road Closure The DOE and its contractors have established procedures for transporting shipments of hazardous waste and mixed waste back and forth between Hanford and PFNW by rolling road closure as follows:

- Rolling road closure plan describes routing and controls for shipments from Hanford to PFNW. DOE approves waste shipments to occur off-site of Hanford on public highway in accordance with the TSD described above.
- A waste shipment route on a public highway has unrestricted public access that is 12.3 miles from the Hanford site Wye Barricade to PFNW via HWY Route 4 South to Horn Rapids Road. Horn Rapids Road in Richland, WA is the south edge of the DOE property.

The waste shipment travels south past Horn Rapids Road onto Stevens Drive and then west onto Battelle Blvd. to PFNW within Richland, WA.

- The waste shipment transport vehicle is escorted by front and rear escort vehicles along the entire route from the Hanford Wye Barricade to PFNW. The rolling road closure moves with the waste transport vehicle and escort vehicles. During a rolling road closure the public has unrestricted access to two lanes in the opposite direction of Hwy Route 4 South. The public has unrestricted access to roads leading to Energy Northwest Nuclear power plant facility and to other public roads that intersect HWY Route 4 South at the DOE-Hanford facility.
  - DOE and its contractors arrange with City of Richland Planning Department to obtain a "Special Event Permit" that allows the transport vehicle on public highway. The transport vehicle transports hazardous and mixed waste on Richland public streets. The public has unrestricted access in traffic lanes on Stevens Drive, Horn Rapids Road and Battelle Boulevard in Richland next to where the hazardous and mixed waste shipment is transported to PFNW.
- Transportation in Commerce The Federal DOT explained the definition of "public highway" in the context of the Hazardous Material Transportation Act (HMTA) and the HMR's in a letter to Ms. Susan Denny from the Federal DOE dated April 23, 1991 (Denny Letter). The Denny Letter explains transportation in commerce as follows:
- The DOE is required to comply with the HMR's when it offers hazardous materials for transportation or transports them in "commerce". DOE's contractors must also comply with the HMR's even if it is in a government vehicle.
  - Roads outside of government properties are generally transportation in commerce.
  - If a road is used by members of the general public (including dependents of government employees) without their having to gain access through a controlled access point, transportation on that road is in commerce. On the other hand, if access to a road is controlled at all times through the use of gates and guards, transportation on that road is not in commerce.
  - One other means of preventing hazardous materials transportation on government property from being in commerce is to temporarily block access to the section of the road being crossed or used for that transportation. The road would have to be blocked by persons having the legal authority to do so, and public access to the involved section of road would have to effectively be precluded.



The CH2MHill Plateau Remediation Company (CHPRC), a contractor for DOE, wrote a Memo dated October 19, 2012 to explain their interpretation of why a rolling road closure transportation activity between two non-contiguous properties does not have to comply with the HMR's. Several statements in the memo reads: *"During a road closure between two non-contiguous facilities, if access is restricted the hazardous material shipment does not become subject to the HMR". "The specific advantage of shipping hazardous materials via road closure is that DOT specific packaging requirements do not apply". "Hence a temporary road closure over a relatively short distance with controlled access points can be more cost-effective than expediting resources for an approved DOT packaging".*

The HMR's describe transport functions that are not subject to the requirements of the HMR's in part 171.1(d)(4) which reads: *"Rail and motor vehicle movements of a hazardous material exclusively within a contiguous facility boundary where public access is restricted, except to the extent that the movement is on or crosses a public road or is on track that is part of the general railroad system of transportation, unless access to the public road is restricted by signals, lights, gates, or similar controls."* Interpretation of part 171.1(d)(4) means that transport of hazardous materials that occur on-site of Hanford would not be subject to the HMR's where public access is restricted at a controlled access point and also by use of signals, lights and gates which are located at the Wye Barricade on-site of the Hanford facility. Transport of hazardous materials by rolling road closure from the Wye Barricade controlled access point onto Route 4 South to Horn Rapid Road and then west onto Battelle Blvd. to PFNW would be subject to the HMR's. Public access between the Wye Barricade and PFNW is unrestricted and there are no signals, lights and gates to restrict, control and effectively preclude public access.

Partial closure of a public road by moving pilot cars during a rolling road closure activity by means of moving pilot cars in front and behind a moving waste transport vehicle does not provide complete restricted public access in all directions and cross-roads from the Wye Barricade controlled access point onto Route 4 South to Horn Rapid Road and then west onto Battelle Blvd. to PFNW. The waste shipment would be subject to the HMR's because the involved section of road is not effectively precluded from public access in all directions.

The definition for "on-site" in WAC 173-303-040 includes the terms contiguous and non-contiguous property. "On-site", as defined in 173-303-040, *means the same or geographically contiguous property which may be divided by public or private right of way, provided that the entrance and exit between the properties is at a cross-roads intersection, and access is by crossing as opposed to going along the right of way. Noncontiguous properties owned by the same person but connected by a right of way which they control and to which the public does not have access, are also considered on-site property.*

The definition of "on-site" allows the transport of hazardous waste without a manifest within or along the border of contiguous property controlled by the same person. Transport of hazardous waste that occurs on-site and within the DOE-Hanford facility operating under RCRA ID# WA7890008967 would be exempt from manifest requirements in accordance with WAC 173-303-180(5) and by reference 40 CFR part 262.20(f). A generator who arranges the transport of hazardous waste to a receiving facility located off-site of DOE-Hanford is not exempt from manifest requirements of WAC 173-303-180.



Federal Register Vol. 62, No. 29, Wednesday, February 12, 1997 (FR 62) clarified that a waste shipment that meets the defining criteria of one or more HMR hazard classes is still subject to HMR shipping paper, packaging, marking, labeling and placarding requirements when it is transported on a public right-of-way that occurs on-site within a contiguous property. Therefore, a shipment of hazardous waste that travels south of the Hanford Wye Barricade on HWY Route 4 South to Horn Rapids Road is on-site of DOE-Hanford property and on a public highway where public access is allowed, remains subject to the HMR's. The only exception is for shipments that consist solely of Hazard Class 9 materials in amounts less than reportable quantities. The transporter who transports a shipment of hazardous waste on-site on a public right-of-way must also comply with WAC 173-303-250 in the event of a spill or discharge of hazardous waste during transport.

➤ HMR Type A and Type B Radioactive Activity Limits and Packaging Requirements

Type A radioactive materials are designated either A<sub>1</sub> or A<sub>2</sub>. A<sub>1</sub> means the maximum activity of special form Class 7 radioactive material permitted in a Type A package. This value is either listed in HMR 173.435 or may be derived in accordance with the procedures prescribed in HMR 173.433. A<sub>2</sub> means the maximum activity of Class 7 radioactive material, other than special form material, low special activity (LSA) material, and solid object (SCO), permitted in a Type A package.

Type A quantity means a quantity of Class 7 radioactive material. The aggregate radioactivity does not exceed A<sub>1</sub> for special form Class 7 radioactive material or A<sub>2</sub> for normal form Class 7 radioactive material. A<sub>1</sub> and A<sub>2</sub> values are listed in HMR 173.435 or are determined in procedures prescribed in HMR 173.433.

Type A radioactive materials must be shipped in a Type A packaging pursuant to HMR 173.410, 173.411 and 173.412. A Type A packaging is subject to testing criteria prescribed in 173.465. A Type A packaging with contents must be capable of withstanding the water spray test, free drop test, stacking test and penetration test pursuant to the testing criteria prescribed in 173.465.

A Type B quantity means a quantity of material with a radioactivity level greater than a Type A quantity. Type B radioactive materials must be shipped in a Type B packaging pursuant to HMR 173.416 and by reference in 10 CFR part 71.

Type B packages for radioactive materials must meet the general packaging and performance standards for Type A packages and additionally must have the ability to survive serious accident damage tests (hypothetical accident conditions) as required in 10 CFR part 71. Among other tests, additional testing requirements for Type B packaging are:

- Thermal exposure of specimen packaging to a fully engulfing thermal environment of at least 1,475<sup>0</sup> F for 30 minutes.
- Puncture test where loaded specimen package is dropped 40 inches onto the upper end of an affixed solid vertical mild steel bar that is 6 inches in diameter with the top horizontal and rounded to a radius of ¼ inch and striking the specimen package at its most vulnerable spot.



- Corner drop on each corner of specimen package constructed of fiberboard, wood, or fissile material rectangular shaped packages not exceeding 110 pounds and the same material constructed packages that are cylindrical not exceeding 220 pounds.
- Testing for water in-leakage which includes immersion of fissile material specimen package under 3 feet of water and also immersion of all specimen packages under at least 50 feet of water.
- Specimen packages containing more than  $10^5$  quantities of Type A<sub>2</sub> radioactive material are to be designed to withstand an external water pressure test of 290 PSI for a period of not less than one hour without collapse, buckling, or in-leaking of water.
- Compression test.
- Penetration test.
- Crush test.
- After testing, there may be only a very limited loss of shielding capability and no loss of containment, as measured by leak-rate testing of the containment system of the package.

Type B packages are fabricated to designs certified by the Nuclear Regulatory Commission (NRC). Each design must be approved under a NRC certificate of compliance and general license issued pursuant to 10 CFR part 71.17. The Federal DOT authorizes use of NRC-approved Type B packages in HMR 173.416(a) and the standard requirements applicable to their use are in 173.471. Type B packages can be approved by the Federal DOE under the authority provided by the Federal DOT in 1HMR 73.7(d).

- March 22 & 23, 2013 Manifested Shipments from Hanford to PFNW DOE and its contractors prepared and arranged the transport of three drums of RSW, a mixed waste, to PFNW. One drum is identified as #0062288, the second drum as #0059937 and the third drum as #2E12B17-1161.

The three drums of waste materials were evaluated according to the Retrieval Special Packaging Authorization R-SPA Shipment Evaluation Checklist number R-SPA-SWOC-2011-006, RP-Acids, Rev. 0 (R-SPA). The completed R-SPA was approved by DOE in accordance with Hanford TSD procedures as documented in a CHPRC Interoffice Memorandum CHPRC-TS-12-008 dated March 6, 2011 from J.C. Lavender-CHPRC Lead for Transportation Safety to Files. The three drum of mixed waste RSW were documented on manifest #008855184 JJK and #008855209 JJK. The waste codes on each manifest were D002-corrosive, D004-arsenic, D005-barium, D006-cadmium, D007-chromium and D008-lead. Each manifest was signed by Casey Carter from CHPRC (offeror) on behalf of DOE-Hanford (generator) dated March 22, 2013. The two manifested shipments are transported to PFNW on March 23, 2012. PFNW representative Dakin R Utley acknowledged receipt of the two manifested shipments by entering his name and by signature and date of receipt on March 23, 2012.

Ecology inspected PFNW on April 19, 2012 and found information about the two manifested shipments described above. Ecology inspection findings revealed that PFNW opened the packages of mixed waste RSW and found each to be holding the following:

- First overpack in shipment consisted of 2,500 ml of nitric acid liquid in carboy that was overpacked in a steel drum. There was damp sludge in the overpack.
- Second overpack holds 500 x 10ml vials partially full of liquid.



- Third overpack holds @ 8 liters of sludge, floor dry and pads. DOE and its contractors had treated sludge with baking soda prior to transport. Drum # 0062288 was in this third overpack.

Review of the R-SPA document associated with the waste materials documented on manifest #0088551JJK and #008855209 JJK revealed the following information:

- Attachment A of R-SPA documented the radiation calculations (RadCalc) in the three drum manifested shipment of RSW to PFNW. RadCalc measurements are conducted of materials in each drum to determine Type A or Type B radioactive activity limits as established in HMR 173.431 and listed in 173.435. RadCalc measurements determined that the aggregated quantity of radioactive activity in each drum exceeded Type A radioactive activity limits. The waste in each drum designates as a Type B radioactive material according to the RadCalc document.
- Packaging Evaluation Description of the R-SPA provided the following:
  - The three containers of RSW are overpacked into DOT Type 7A containers and a Type 7A metal box.
  - Drum 0062288 is placed within two 10-mil plastic bags and overpacked into an 85-gallon overpack container. 10 pounds of baking soda and Batt-Mat pads also placed within overpack container.
  - Drum 0059937 is placed within an 85-gallon overpack and then again into a 110-gallon overpack container with acid neutralizing/absorbent material. This drum held liquids and previously leaked. NOTE: This drum originated from a dangerous waste management unit at the Waste Receiving and Packaging Facility (WRAP) at DOE-Hanford which previously leaked an unknown liquid, a caustic, to the floor. The drum had been mis-designated for liquids.
  - Drum 2E12B17-1161 placed into a 20 mil PVC drum bag with acid resistant absorbing pads and then overpacked into an 85-gallon overpack with additional absorbing pads.
  - Drum 0059937 and 2E12B17-1161, each both being placed into a 110-gallon overpack, is placed into an 8'x8'x4' metal box with Batt-Mat pads covering the floor.
- Attachment D Container Certificates of Compliance (CoC) of the R-SPA for the containers that the Type B mixed waste RSW is packaged in provided the following:
  - DOE and its contractors purchase non-bulk packagings (110 gallons or less) from container manufacturers Myers Container Corporation, Skolnik and Container Technologies Industries, LLC. These companies tested the non-bulk packagings in accordance with HMR 173.465 Type A radioactive packaging testing criteria requirements. The drums are made of steel. The non-bulk packagings are tested by means of spray test, free drop test, stacking test and penetration test. CoC documents from these three companies certified that the test results for the non-bulk packagings used by DOE-Hanford and its contractors were compliant with 173.465 Type A radioactive packaging standards.
  - DOE, its contractors and container manufacturers did not conduct testing of non-bulk packagings required under 49 part 173.467 and by reference 10 CFR part 71 for demonstrating the ability of Type B and fissile radioactive materials packagings to



withstand accident conditions in transportation and meet the test requirements prescribed in 10 CFR part 71. These Type B packaging standards are described in detail above under the heading HMR Type A and Type B Radioactive Activity Limits and Packaging Requirements.

### **Regulatory Issues with RSW Mixed Waste Designation**

Buried waste streams and waste codes in the 1985 Part B Permit application do not match with the same waste streams and waste codes in the February 2010 AKR document. The AKR states that buried waste consists primarily of heterogeneous debris, solids, soil/sediment, absorbed oil, ash, cemented liquids and animal waste. The AKR does not include D001-ignitable, D002-corrosive and D003-reactive waste streams and liquids. However, AKR Table 3-1 does include packaging provisions for oxidizers (nitric acid), liquids, damp waste and combustibles.

DOE-Hanford has not properly designated and defined RSW. This will result in waste shipments not being properly prepared for transport pursuant to WAC 173-303-190 and by reference 49 CFR parts 172, 173, 178 and 179 HMR packaging, marking, labeling and placarding requirements. RSW that is not properly identified, designated and defined by the generator will result in problems with documenting proper shipping descriptions, package types, and waste codes on manifests and on associated LDR paperwork. Waste that is improperly designated may not be acceptable according to the permit conditions of a treatment, storage and disposal facility where it is transported to depending on the actual contents of the container.

DOE-Hanford must properly designate all RSW mixed waste in accordance with WAC 173-303-140(2) and by reference in 40 CFR part 268.2(g) and FR 57. DOE-Hanford must properly designate all RSW mixed waste to determine if it:

1. Defines as debris according to WAC 173-303-140(2) and by reference in 40 CFR part 268.2(g)
2. Is stored within an intact non-empty container.
3. Is stored within an non-intact container.
4. Is mixed with free liquids and debris in an intact non-empty container.
5. Is leaking from each intact container and holds free flowing liquids.
6. If the liquid portion in an intact non-empty container is entrapped within the debris.
7. DOE-Hanford must develop and implement site operating procedures to properly identify and treat all RSW that defines as a debris in WAC 173-303-140(2) and by reference in 40 CFR part 268.

DOE-Hanford is arranging to send improperly designated and packaged waste to PFNW. PFNW accepts the improperly designated and packaged waste and conducts further evaluation and designation of the waste at the PFNW facility. After the March 22 & 23, 2013 manifested shipments of mixed waste from Hanford to PFNW (described above), Ecology obtained information from the Washington State Department of Health (WADOH) concerning this shipment. WADOH reported to Ecology the following about what happened at PFNW after it had accepted the above described shipments:

- PFNW had notified WADOH several days before April 27, 2012 about a release from Hanford Waste Receiving and Processing Facility (WRAP) drums that were transported to PFNW and stored within the PFNW Double Containment Unit (DCU).
- PFNW opened up three WRAP drum shipment in the DCU.



- Acids and radiation were released within the DCU.
- PFNW jack hammered and scabbled out the contaminated floor of the DCU.
- PFNW finds that radiation release had occurred wherever the drum had been moved within the PFNW facility boundary.

Improper identification, designation and packaging of mixed waste by DOE and its contractors and arranging to transport to PFNW for further evaluation has caused an imminent hazard to public health and the environment at the point of generation at Hanford, during transport on public highway, and at the treatment, storage and disposal facility at PFNW.

### **Regulatory Issues with Preparing Mixed Waste for Transport**

DOE document titled as: *“Positive Impacts of American Reinvestment and Recovery Act (ARRA) Funding to the Waste Management Program on Hanford’s Plateau Remediation Project”* dated January 19, 2010 states that close proximity to PFNW allows direct packaging in modified or custom designed Type A packaging for direct transfer to PFNW. This document also states that transporting radioactive materials in Type A packaging to PFNW for treatment avoids risks and costs of transferring and storing the waste on-site at Hanford over many years.

DOE document titled as: *“The Successful Utilization of Commercial Treatment Capabilities to Disposition Hanford’s No-Path-Forward, Suspect Transuranic Waste (UCTW)”* dated January 30, 2012 states:

“Majority of Phase Two and Phase Three Wastes contain greater than A2 quantities of radionuclides and existing Type B packages for Type B radionuclide quantities are not large enough to transport majority of whole waste and prohibitive to develop.

Type B quantity radioactive waste is packaged into HMR Type A packaging as a risk-based packaging according to Hanford TSD methodologies. The roads between Hanford and PFNW are on DOE property and can be controlled to avoid interaction with the public and workers. CHPRC designed and procured Type A packages for use in transporting Type B waste to PFNW.

Cost Benefits to designate and transport Type B radioactive material in a Type A packaging and processed at PFNW would avoid estimated costs of \$540 million for a new facility and \$1.2 billion operational costs over 10 years if size reduction, segregation, characterization and packaging into WIPP compliant forms all occurred at Hanford.”

Improper packaging of Type B radioactive materials may result in a release of radiation and hazardous materials to the public and the environment when it is transported on public highway between the Wye Barricade and PFNW.

### **Transportation in Commerce**

Transport of hazardous materials by rolling road closure from the Wye Barricade controlled access point onto Route 4 South to Battelle Blvd. and to PFNW is subject to the HMR’s. Public access is



unrestricted and there are no signals, lights and gates to restrict, control and effectively preclude public access between the Wye Barricade and PFNW.

Transport of hazardous waste within the DOE-Hanford facility operating under RCRA ID# WA7890008967 would be exempt from manifest requirements in accordance with WAC 173-303-180(5) and by reference 40 CFR part 262.20(f). If a hazardous waste shipment is not subject to the manifest requirements it is still subject to HMR shipping paper, packaging, marking, labeling and placarding requirements when it is transported on a public right-of-way.



### Compliance Problems

The Dangerous Waste inspection on January 31, 2013 to July 8, 2013 found the following compliance problems.

Each problem is covered in three parts:

- (1) **citation from the regulations**
- (2) **specific observations** from the inspection that highlight the problem
- (3) **required actions** needed to fix the problem and achieve compliance.

1. **WAC 173-303-170(1) and by reference 070(3): Sites must properly designate solid waste prior to disposal. Sites must follow proper procedures when determining if a solid waste is also a dangerous waste or an extremely hazardous waste.**

1985 Part B Application for the Low-Level Burial Grounds (LLBG) and Retrievable Storage (Part B) The Part B Application states that significant quantities of ignitable, corrosive liquids and reactive wastes are buried in the trenches. The Part B Application states that up to 15 gallons of liquid per 55-gallon drum were buried in the trenches until 1977. Part B identifies D001-Ignitable, F001-F005-Chlorinated and non-chlorinated solvents, U151 and D009-Mercury, D008-Lead, WT01-WA State-only extremely hazardous waste, WT02-WA state-only dangerous waste, WP01-WA state-only extremely persistent dangerous waste, WPO2-WA state-only persistent dangerous waste and WC01 and WC02-WA state-only carcinogenic dangerous waste as being buried in the Hanford LLBG.

February 2010 Acceptable Knowledge Summary Report for the Hanford-One Waste Stream (AKR)- The AKR identifies RSW as being a hazardous debris that does not contain liquids or waste codes for D001 ignitable, D002 corrosive or D003 reactive wastes. Additionally, the AKR identifies the following RSW waste streams buried in the trenches:

- Toxic Metals- D004-Arsenic, D005-Barium, D006-Cadmium, D007-chromium, D009-Mercury, D010-Selenium, D011-Silver
- Toxic Organics-D018-Benzene, D019-Carbon tetrachloride, D022-chloroform, D027-1,4-dichlorobenzene, D028-1,2-dichloroethane, D029 1,1-dichloroethylene, D030-2,4-dinitrotoluene, D034-hexachloroethane, D035-methyl ethyl ketone, D037-pentachlorophenol, D043-vinyl chloride
- Spent Solvents-F001, F002, F003, F004, F005-chlorinated and non-chlorinated solvents
- Buried waste streams designated in the 1985 Part B Application do not match the same waste streams designated in the February 2010 AKR document.
- MLLW and TRUM retrieved from the Hanford burial grounds is transported on-site to the Hanford Solid Waste Operations Complex (SWOC), T-Plant Complex, Waste Receiving and Processing Facility (WRAP), or the Central Waste Complex (CWC). Each of these facilities is



also referred to as being a treatment, storage and/or disposal (TSD) dangerous waste management unit.

DOE-Hanford has not properly designated RSW.

**Action Required:** When returning the enclosed Compliance Certificate, provide documentation that designation of the following solid wastes has occurred. The documentation shall at least include copies of the analytical results of designation testing and justification for any determinations that are based on generator knowledge as defined in WAC 173-303-040.

1. Waste materials generated at Low Level Burial Grounds Waste Retrieval Project Unit 17 (RSW).
  2. RSW that defines as debris in accordance with WAC 173-303-140(2) and by reference 40 CFR Part 268.2(g).
  3. RSW that does not define as debris in accordance with WAC 173-303-140(2) and by reference 40 CFR Part 268.2(g). RSW waste streams that do not define as debris include the following:
    - All waste materials contained within an intact container. The “primary materials” within an intact non-empty container is subject to designation. The empty container rule in WAC 173-303-160 must be used to determine when an intact container holds a mixed hazardous waste and/or a hazardous waste.
    - Intact containers are never considered to be debris. Intact containers that are dented but not ruptured (e.g., vials, buckets, drums, boxes, cartons, cases, roll-off boxes, kegs, carboys, bags, barrels, etc.) that hold a mixed waste do not define as debris. The LDR standards apply in cases where the debris and the waste are inseparable within a container.
    - By intact container EPA means a container that can still function as a container. A container that is unbroken and still retains at least 75% of its original holding capacity is still intact.  
*Example: At a remediation site, ruptured drums are discovered still containing some prohibited hazardous waste. Mixed with these drums are other drums that are not significantly damaged or crumpled and still contain prohibited hazardous wastes. Under the LDR's the ruptured drums are debris and cannot be land disposed until treated by one of the debris treatment methods (40 CFR part 268.45). If hazardous waste is removed from the drum during treatment the waste like all treatment residues, is subject to the LDR's treatment standards for a prohibited waste. With respect to the unruptured drums, those that are intact (e.g., those that contain 75% of their original volume) are nonempty under 40 CFR part 261.7 or in WAC 173-303-160. The waste in the unruptured and intact drums are subject to the treatment standards for the prohibited waste (e.g., waste in non-empty container is subject to all LDR prohibitions as well as all applicable RCRA 40 CFR and chapter 173-303 WAC regulations). Those that are not intact (e.g., those that contain less than 75% of their original volume) are debris*
2. 49 CFR part 173.158 incorporated by reference in WAC 173-303-190(1) **Offering nitric acid in an unauthorized packaging. Nitric acid when offered for transportation by highway shall be packaged in specification stainless steel drums as specified in 173.158.**

Nitric acid was placed into a steel overpack drum by DOE contractors. The overpack drum was not made of stainless steel. Stainless steel drums were not included for package specification testing in Attachment D Container CoC in Retrieval Special Packaging Authorization R-SPA Shipment



Evaluation Checklist number R-SPA-SWOC-2011-006, RP-Acids, Rev. 0 (R-SPA) dated March 6, 2012. The waste nitric acid was transported in an unauthorized packaging on public highway to PFNW who accepted it on March 23, 2012.

**Action Required:** Waste nitric acid must be packaged in stainless steel drums that meet the packaging specifications in 49 CFR part 173.158.

3. **49 CFR part 173.416 incorporated by reference in WAC 173-303-190(1). Type B radioactive mixed waste must be shipped in a Type B packaging pursuant to 173.416 and by reference in 10 CFR part 71.**

Attachment A Retrieval Packages (RadCalc Data) of Retrieval Special Packaging Authorization R-SPA Shipment Evaluation Checklist number R-SPA-SWOC-2011-006, RP-Acids, Rev. 0 (R-SPA) dated March 6, 2012 show that RadCalc measurements were conducted mixed radioactive mixed waste in three drums to determine Type A or Type B radioactive activity limits as established in 49 CFR part 173.431 and listed in 173.435. RadCalc measurements determined that the aggregated quantity of radioactive activity in each drum of mixed waste exceeded Type A radioactive activity limits and designated as a Type B radioactive mixed waste. The Type B mixed waste was placed into a Type A packaging. The Type B mixed waste packaged into each Type A drum was transported on public highway to PFNW who accepted it on March 23, 2012.

Attachment D Container CoC in Retrieval Special Packaging Authorization R-SPA Shipment Evaluation Checklist number R-SPA-SWOC-2011-006, RP-Acids, Rev. 0 (R-SPA) dated March 6, 2012 reveals that Type B mixed waste was placed into a Type A packaging. The Type B mixed waste packaged into a Type A drum was transported on public highway to PFNW who accepted it on March 23, 2012.

**Action Required:** Type B radioactive mixed waste must be shipped in a Type B packaging pursuant to 173.416 and by reference in 10 CFR part 71.

#### **Recommendation for Further Documentation Review**

Dangerous Waste Annual Report data for DOE-Hanford from 2009 to 2012 show that approximately 2,337,675 pounds of hazardous waste was transported from Hanford to PFNW. Ecology needs documentation to determine the quantity of mixed hazardous waste and non-radioactive hazardous waste generated on-site. Ecology needs information on the methods used to designate mixed waste and prepare it for transport between DOE and PFNW according to the Hanford Sitewide Transportation Safety Document (TSD) June 2011 to further evaluate compliance. The following records from DOE should be requested by the Nuclear Waste Program.

- WAC 173-303-210(1)-Each manifest signed by the initial transporter for three years, and each signed copy of each manifest from the designated receiving facility for the past five years.
- WAC 173-303-210(2)-Copies of each Annual Report and exception report as required under 173-303-220 for the past five years from the due date of each report.
- WAC 173-303-210(3)-Waste designation records for the past five years from the date the waste was last transferred for on-site or offsite treatment, storage or disposal.

- WAC 173-303-210(4)-Other records as required for generator who accumulate waste on-site under 173-303-200 for the last five years.
- WAC 173-303-210(5)-Periods of retention for any records described in -210 will be automatically extended during the course of any unresolved enforcement action requiring these records or upon request by the director.
- WAC 173-303-210(6) -All generator records, including plans required by this chapter, will be made available and furnished upon request by the director. These generator records include LDR documents and Special Packaging Authorization (SPA) documents for each shipment of mixed waste and non-radioactive hazardous waste that was prepared and transported to PFNW.

### **Summary of Concerns**

1. The “rolling road block” function procedures do not conform to the terms of the exemption from transportation in commerce as explained in the Denny Letter and in 40 CFR Part 171.1(d)(4). Transportation of radioactive mixed waste and hazardous materials between the DOE-Hanford Facility and PFNW are not exempt from HMR’s.
2. Transportation practices for mixed waste from the Hanford Facility to PFNW do not conform to the requirements of the dangerous waste regulations and the HMR’s incorporated by reference.
3. The selection of non-compliant packages to transport mixed waste presents a risk to human health and the environment.
4. Ecology will review additional information on past waste shipments between the DOE-Hanford Facility and PFNW. Ecology will determine compliance with the regulatory requirements that are applicable to transportation and waste designation activities. Ecology will evaluate the evidence to determine issuance of a formal or informal enforcement action procedure.



## **Appendix**

### **HAZARDOUS WASTE DESIGNATION AND TRANSPORTATION PROBLEMS AT HANFORD AND PERMAFIX NORTHWEST**

#### **VOLUME I – Waste Designation**

##### **Section 1 – Description of Problem**

- 1) Providing an Integrated Waste Management Strategy and Operation Focused on Project End States at the Hanford Site (Waste Management Symposium Presentation) — 2009
- 2) The Positive Impacts of the Recovery Act (ARRA) Funding to the Waste Management Program on Hanford's Plateau Remediation Project (Waste Management Symposium Presentation) — 2010
- 3) Permafix Northwest (PFNW) Services Provided to CH2MHILL Plateau Remediation Contract (CHPRC) Team at Hanford (according to the Permafix website)
- 4) Audit Report, U.S. Department of Energy Office of the Inspector General "Waste Processing and Recovery Act Acceleration Efforts for Contact-Handled Transuranic Waste at the Hanford Site" — 2010
- 5) Managing Hanford's Legacy, "No-Path-Forward" Wastes to Disposition (Waste Management Symposium Presentation) — 2011
- 6) The Successful Utilization of Commercial Treatment Capabilities to Disposition Hanford's No-Path-Forward, Suspect Transuranic Wastes (Waste Management Symposium Power Point Presentation) — 2012
- 7) The Successful Utilization of Commercial Treatment Capabilities to Disposition Hanford's No-Path-Forward, Suspect Transuranic Wastes (Waste Management Symposium Presentation) – 2012

##### **Section 2 – Historical Description of Dangerous Waste**

- 1) RCRA Part B Permit Application Low-Level Burial Grounds and Retrievable Storage – 1985
- 2) Draft RCRA Part B Permit Application Low-Level Burial Grounds – 2002
- 3) M-91 Mixed Low-Level Waste Project Management Plan (PMP) Revision 0 – 2003
- 4) Challenges with Retrieving Transuranic Waste from the Hanford Burial Grounds – 2007
- 5) Next Generation Waste and Retrieval and Disposal — 2009
- 6) Acceptable Knowledge Summary Report for the Hanford-One Mixed Transuranic Waste Stream (Hanford One AKR) – 2010

##### **Section 3 — Waste Management History**

- 1) Administrative Order 1671 (Site Wide Generator Sweep April 2004) — 2004

- 2) Dangerous Waste Compliance Inspection M-91-40 Milestone Inspection — 2005
- 3) Dangerous Waste Compliance Inspection Container Management and Waste Verification at T-Plant — 2005
- 4) Permafix Northwest RCRA Permit Section C, Waste Analysis Plan — 2009
- 5) Permafix Northwest Operational Procedure: Nevada Test Site Mixed Waste Macroencapsulation (MWOP: 325) — 2009
- 6) Permafix Northwest TRU and TRUM Waste Size Reduction and Repackaging (QAPP-10-01) — 2010
- 7) Hanford Site Solid Waste Acceptance Criteria (HNF-EP-0063) Revision 15 — 2010
- 8) National Enforcement Investigations Center (NEIC) Office of the EPA. Two Week Inspection of the Solid Waste Operation Complex (SWOC) Facilities, In-Brief — 2011
- 9) U.S. Department of Energy, Contact Handled and Remote Handled Transuranic Waste Packaging (DOE N 435.1) — 2011
- 10) The Successful Utilization of Commercial Treatment Capabilities to Disposition Hanford's No-Path-Forward, Suspect Transuranic Wastes (Waste Management Symposium Presentation) — 2012
- 11) PermaFix Northwest (PFNW) Inspection Report — 2012
- 12) Central Waste Complex (CWC) Inspection Report — 2012
- 13) Waste Receiving and Processing Facility (WRAP) — 2012
- 14) Ecology Letter and Review Comment Record (RCR) rejecting the M-91 PMP Revision 11 – 2012
- 15) M-91 PMP Revision 11 — 2012

## **VOLUME II — Transportation**

### **Section 1 – Alternate Transportation Solutions**

- 1) PFWN Class 2 Permit Modification Request (PMR) to Modify Container Loading and Unloading of Rail Cars that will be in Conjunction with Rail Car Spur — 2010
- 2) Freedom of Information Act (FOIA) Request Tri-City Rail Lawsuit (Hanford Rail) — 2010
- 3) Idaho National Laboratory (INL) Haul Road in Idaho to Ease Onsite Nuclear Transport Issues — 2010
- 4) CH2M Hill Plateau Remediation Company (CHPRC) Monthly Performance Report January 2011 — 2011
- 5) PFWN Rail Spur Permit Modification Request (PMR) — 2011
- 6) PFWN Transuranic Waste Project PMR – 2011



## **Section 2 – Transportation Management Planning**

- 1) Department of Transportation Motor Carrier Safety Management Plan Revision 3 – 2012
- 2) Mission Support Alliance (MSA) Monthly Report December – 2009
- 3) CHPRC Monthly Report March — 2010
- 4) MSA Monthly Report September — 2010

## **Section 3 – Hanford Transportation Safety Documents**

- 1) Hanford Site Wide Transportation Safety Document Revision 1E – 2011
- 2) Hanford Transportation Procedures – 2012

## **Section 4 – Transportation Communications**

- 1) E-mail Correspondence from Dean Nester (CHPRC) to Dennis Claussen (USDOE Transportation) — 2012
- 2) Special Packaging Authorization (CE-SPA) – RSW — 2011
- 3) Special Packaging Authorization (R-SPA) – Acidic Debris — 2012
- 4) CHPRC Training Document: RCRA Manifest Applicability During Road Closure — 2012
- 5) CHPRC Training Document: DOT and Road Closures — 2012
- 6) Washington State Department of Ecology and USDOE Meeting on Transportation Issues Sign-In Sheet, Notes, and Handouts — 2012
- 7) E-Mail to Hanford Employees: Rolling Road Closure – PFP to PFNW December 14, 2012
- 8) ARRA Weekly Reports – 2011
- 9) City of Richland Street Closure Permits — 2011 through 2013